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Colorimetric-based detection of *Ureaplasma urealyticum* using gold nanoparticles

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Abstract

Ureaplasma urealyticum (uu) is one of the most common agents of urogenital infections and is associated with complications such as infertility, spontaneous abortion and other sexually transmitted diseases. Here, a DNA sensor based on oligonucleotide target-specific gold nanoparticles (AuNPs) was developed, in which the dispersed and aggregated states of oligonucleotide-functionalised AuNPs were optimised for the colorimetric detection of a polymerase chain reaction (PCR) amplicon of *U. urealyticum* DNA. A non-cross-linking approach utilising a single Au-nanoprobe specific of the urease gene was utilised and the effect of a PCR product concentration gradient evaluated. Results from both visual and spectral analyses showed that target–Au-nanoprobe hybrids were stable against aggregation after adding the inducer. Furthermore, when a non-target PCR product was used, the peak position shifted and salt-induced aggregation occurred. The assay's limit of detection of the assay was 10 ng with a dynamic range of 10–60 ng. This procedure provides a rapid, facile and low-cost detection format, compared to methods currently used for the identification of *U. urealyticum*.